July 21, 1931. B. F. FRIBERG 1,815,373

JOINT FOR CONCRETE SLABS

Filed Dec. 15, 1930

FIG. 1

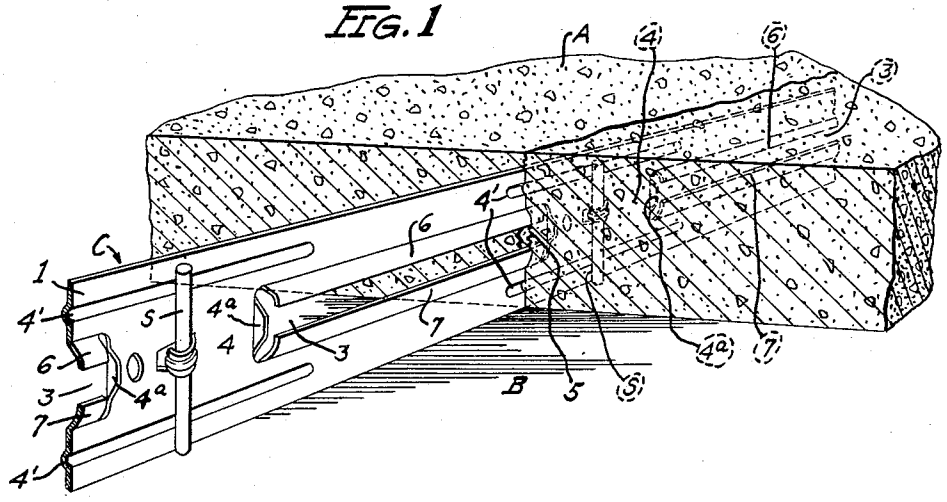
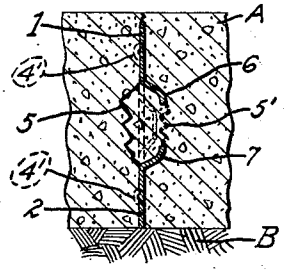


FIG. 2



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JOINT FOR CONCRETE SLABS

Application filed December 15, 1930. Serial No. 502,286.

This invention relates generally to concrete pavements and like structures, and more specifically to improved means for controlling the lines of fracture occurring in the surfaces of such structures, the predominant object of the invention being to provide improved means adapted to be embedded in a concrete pavement, or like structure, which will cause the pavement to crack along a predetermined line if for some reason tensional stresses in the concrete slab exceed the strength of the concrete itself.

The device of the present application is an improvement of the joint for concrete slabs covered by United States Letters Patent No. 1,768,555, granted on July 1, 1930, on an application filed in my name on April 15, 1929. This patent describes in more or less detail the advantages of joints of the type disclosed herein over roadway joints of the types previously employed, and attention is directed to the patent referred to for such information.

The joint disclosed in the patent referred to above includes, among other elements, certain streng hening flanges which extend longitudinally of the patented joint. The longitudinally extended flanges of the patent are substantially flat; that is to say, there is no substantial transverse curvature to said flanges, and while the flat flanges of the patented arrangement functioned with very great efficiency, it has been discovered that a slightly improved result may be obtained by curving said flanges slightly in a transverse direction as disclosed in the present application. In the use of the patented joint there was a slight tendency for cracks to be formed which extended substantially horizontally from the sharp edges of the flanges, and by curving the flanges as disclosed herein the formation of such substantially horizontal cracks is prevented.

Fig. 1 is a fragmentary sectional perspective of a roadway having my improved joint associated therewith.

Fig. 2 is a cross-section taken through a portion of the roadway and the joint illustrated in Fig. 1.

In the drawings, wherein is shown for purposes of illustration, merely, several forms of the invention, and referring particularly to Fig. 1 thereof, A designates a concrete roadway which may be constructed in the usual manner and rests upon the ground or other base B. C designates one of my improved joints, said joint being extended along the pavement in a line where a crack, should such occur, may be conveniently provided for.

Referring now to the improved joint C, said joint comprises an element composed of a pair of strips 1 and 2 formed of suitable material, which are separated from each other in a vertical direction to provide a space 3 therebetween. Although they are not entirely essential, I prefer to arrange connecting portions 4, which serve to connect the upper strip 1 and the lower strip 2 together. The connecting portions 4 may be formed integrally with the strips 1 and 2, or may, if desired, be separate elements secured thereto, and said connecting portions are arranged substantially vertically and a space of considerable extent is provided between each adjacent pair of such portions, as shown clearly in Fig. 1.

In the production of a road having one of my improved joints associated therewith, the lower strip will rest upon the ground or other base, as suggested in Fig. 1, or will be located near the ground or other base, and the upper strip will be positioned so that its top edge will be located a short distance below the surface of the pavement. The upper and lower strips of the joint C will be supported in a substantially vertical position by suitable means, such as stakes S, which, if desired, may be driven into the ground. The concrete of which the roadway is comprised is then placed in position in the usual manner, said concrete flowing from one side of the roadway to the other through the space 3 between the strip portions 1 and 2 and between the spaced connecting portions 4 when present. Also, the provision of a joint with an open web gives full freedom to the user of the joint for extending such material as dowels or reinforcement from one part of the pavement to an adjoining part thereof. Be-

cause the top edge of the strip portion 1 is spaced downwardly from the surface of the roadway, there will be no indication at the surface of the roadway of the presence of the strip C.

When a concrete roadway having one of my improved joints associated therewith is subjected to stresses adjacent to the joint which are of sufficient severity to cause fracture of the pavement, such fracture will occur at the plane of weakness created by the joint and the crack will be controlled as to its location at the two strips of the joint. In other words, the crack at the surface of the roadway will follow the upper edge of the upper strip and will therefore be substantially straight, and the crack through the portion of the concrete body between the strip 1 and the strip 2 will be irregular, as indicated in the drawings, so as to provide tongue portions on the slab portions at opposite sides of the crack capable of interlocking with each other to prevent vertical displacement of the slab portions relative to each other.

To provide my strip with the required rigidity I may, if desirable, arrange an offset flange 6 at the bottom edge of the upper strip portion 1 and a similar flange 7 at the top edge of the lower strip portion 2. These flanges 6 and 7 are preferably extended outwardly from the same side of the strip C, and, as shown clearly in both views of the drawings, said flanges are curved transversely, the flange 6 being curved outwardly and downwardly, and the flange 7 being curved outwardly and upwardly, so that the outer edge portions of said flanges approach each other. The importance of curving the flanges 6 and 7 transversely as described results from the fact that the crack across the space between the strips 1 and 2 frequently extends downwardly from the outer edge of the longitudinally extended strengthening flange 6. Where such cracking of the slab occurs, there is a chance that the crack will extend in a substantially horizontal direction, or a direction with the same slope as the flange itself, out into the concrete away from the joint rather than between the upper and lower parts of the joint, resulting in some possibility of additional cracks away from the joint. However, when the flanges 6 and 7 are curved transversely as described in the present application, any cracks opening up from the outer edges of the flanges 6 and 7 will converge toward each other and the concrete outside of the joint will be left intact.

As already stated, it is not absolutely essential that my improved joint be provided with the connecting portions 4, and when they are omitted, the separate strips 1 and 2 will be maintained in their proper vertical positions during production of the roadway by suitable supporting means. Also, when the connecting portions are not employed the flanges 6 and 7 may be made continuous from end to end of the strip portions, if desired, and when connecting portions are employed suitable strengthening ribs, such as those designated in Fig. 1 by the reference character 4′, may be provided to give the joint sufficient stiffness to allow its handling before it has reached its place in the road slab. These strengthening ribs are extended longitudinally of the joint and preferably overlap the portions of the joint adjacent to the connecting portions 4. Also, to provide additional strength transversely of the connecting portions 4, I employ the outwardly extended flanges 4^a which are located at opposite ends of said connecting portions and extend transversely of the joint.

By predetermining the location of the crack at the bottom as well as at the top of the concrete pavement by strips arranged in a vertical plane as described, the extension of the crack along a sloping plane through the slab is prevented, and complete interlocking of the parts of the slab is insured by the irregularity of fracture between the two strips. Also, by arranging the two strips of the joint close to the top and bottom surfaces of the slab where the greatest stresses due to temperature changes occur, and where the cracks will be initiated, it is quite evident that the controlling of the location of the crack will be more completely assured with a lesser amount of material than if these strips, as heretofore, should extend through the center portion of the slab.

It is to be noted that the flanges 6 and 7 do not, in any sense, serve to interlock the slab portions at opposite sides of the joint together, but act merely as strengthening elements for the strips.

I claim:

1. A joint for roadway slabs comprising a crack-locating element adapted to be embedded in a body of concrete constituting a slab of a roadway or similar structure immediately adjacent to the top surface thereof, a second element adapted to be embedded in the body of concrete adjacent to the bottom thereof, the first and second mentioned elements being of like characteristics and being separated from each other in a vertical direction to provide a free space therebetween and being permanently associated with each other, said free space being so located and proportioned as to induce concrete with which the joint is associated to crack at said free space, and strengthening flanges extended longitudinally of said elements, said strengthening flanges being curved transversely.

2. A joint for roadway slabs comprising a crack-locating element adapted to be embedded in a body of concrete constituting a slab of a roadway or similar structure immediately adjacent to the top surface thereof, a second element adapted to be embedded in the

body of concrete adjacent to the bottom thereof, the first and second mentioned elements being of like characteristics and being separated from each other in a vertical direction to provide a free space therebetween and being permanently associated with each other, said free space being so located and proportioned as to induce concrete with which the joint is associated to crack at said free space, and strengthening flanges extended longitudinally of said elements, said strengthening flanges being curved transversely so as to cause the outer edge portions thereof to approach each other.

3. A joint for roadway slabs comprising a crack-locating element adapted to be embedded in a body of concrete constituting a slab of a roadway or simliar structure immediately adjacent to the top surface thereof, a second element adapted to be embedded in the body of concrete adjacent to the bottom thereof, the first and second mentioned elements being of like characteristics and being separated from each other in a vertical direction to provide a free space therebetween and being permanently associated with each other, said free space being so located and proportioned as to induce concrete with which the joint is associated to crack at said free space, and strengthening flanges extended longitudinally of said elements, said strengthening flanges including an outwardly and downwardly curved flange adjacent to the lower edge of the upper element and an outwardly and upwardly curved flange adjacent to the upper edge of the lower element.

4. A joint for roadway slabs comprising a crack-locating element adapted to be embedded in a body of concrete constituting a slab of a roadway or similar structure immediately adjacent to the top surface thereof, a second element adapted to be embedded in the body of concrete adjacent to the bottom thereof, the first and second mentioned elements being of like characteristics and being separated from each other in a vertical direction to provide a free space therebetween and being permanently associated with each other, said free space being so located and proportioned as to induce concrete with which the joint is associated to crack at said free space, strengthening flanges extended longitudinally of said elements, said strengthening flanges including an outwardly and downwardly curved flange adjacent to the lower edge of the upper element and an outwardly and upwardly curved flange adjacent to the upper edge of the lower element, and connecting portions for connecting the first and second mentioned elements together.

5. A joint for roadway slabs comprising a crack-locating element adapted to be embedded in a body of concrete constituting a slab of a roadway or similar structure immediately adjacent to the top surface thereof, a second element adapted to be embedded in the body of concrete adjacent to the bottom thereof, the first and second mentioned elements being of like characteristics and being separated from each other in a vertical direction to provide a free space therebetween and being permanently associated with each other, said free space being so located and proportioned as to induce concrete with which the joint is associated to crack at said free space, strengthening flanges extended longitudinally of said elements, said strengthening flanges including an outwardly and downwardly curved flange adjacent to the lower edge of the upper element and an outwardly and upwardly curved flange adjacent to the upper edge of the lower element, and longitudinally spaced connecting portions for connecting the first and second mentioned elements together.

In testimony that I claim the foregoing I hereunto affix my signature.

BENGT F. FRIBERG.